

C What is claimed is: ~~CLAIMS~~

- See 17
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1. Apparatus for providing a client/server based virtual environment wherein each entity in the virtual environment is represented as a plurality of associated
5 models of the entity, each of said plurality of models relating to a particular aspect of the entity, the apparatus comprising:

a server implemented rule model manager arranged to provide conceptual models of the entities in the virtual environment;

- at least one server implemented dynamic model manager, the or each
10 dynamic model manager being arranged to provide a dynamic model of at least one of the entities in the virtual environment;

at least one client, the or each client being arranged to provide a visual model of at least one of the entities in the virtual environment: and

- communication channels for transmitting messages between the rule
15 model manager, said at least one dynamic model manager and said at least one client to ensure consistency.

2. Apparatus according to claim 1 wherein the communication channels include at least one channel which transmits messages in an unreliable manner.
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3. Apparatus according to claim 1 ~~or 2~~, in which said at least one dynamic model manager comprises a set of distributed dynamic model managers running on a plurality of servers, a central environment manager being provided to manage the routing of messages between from the rule model manager to said set of
25 distributed dynamic model managers.

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4. Apparatus according to ~~any of claims 1 to 3~~ ^{Claim 1}, in which said at least one dynamic model manager comprises a plurality of zone managers, each zone manager being arranged to provide a dynamic model of at least one entity present
30 in a zone of the virtual environment associated with the zone manager.

5. Apparatus according to claim 4 which is arranged to start and close a zone manager in response to the behaviour of a dynamic model in the associated zone.

6. Apparatus according to claim 4 ~~or 5~~, in which the or each client is arranged to establish connections to the zone manager representing the zone of the client and to the zone managers representing the zones surrounding the zone of the client.

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Claim 1

7. Apparatus according to ~~any of claims 1 to 6~~, wherein the or each dynamic model manager provides a multi-cast address for at least one dynamic model of an entity of the virtual environment.

10 8. Server apparatus for a client/server based virtual environment wherein each entity in the virtual environment is represented as a plurality of models of the entity, each of said plurality of models relating to a particular aspect of the entity, the server apparatus comprising:

15 a server implemented rule model manager arranged to provide conceptual models of the entities in the virtual environment;

at least one server implemented dynamic model manager, the or each dynamic model manager being arranged to provide a dynamic model of at least one of the entities in the virtual environment; and

20 communication channels for transmitting messages between the rule model manager and said at least one dynamic model manager.

25 9. Client apparatus for a client/server based virtual environment wherein each entity in the virtual environment is represented as a plurality of associated models of the entity, each of said plurality of models relating to a particular aspect of the entity, the apparatus comprising:

at least one client, the or each client being arranged to provide a visual model of at least one of the entities in the virtual environment; and

30 communication channels for transmitting messages between said at least one client, a server implemented rule model manager arranged to provide conceptual models of the entities in the virtual environment, and at least one server implemented dynamic model manager, the or each dynamic model manager being arranged to provide a dynamic model of at least one of the entities in the virtual environment.

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